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XIII.—*On the species of Marmot inhabiting the Himalaya, Tibet, and the adjoining regions.*—By W. T. BLANFORD, F. R. S., F. Z. S.

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The distinctions and nomenclature of the Himalayan and Tibetan species of marmot appear to me in need of careful revision. The necessity for investigating the subject during an endeavour to ascertain the name of the Ladák species, and of a new form of which specimens were obtained by Dr. Stoliczka at the Kaskasu pass, on the road from Yárkand to the Pámir plateau, has convinced me that the received synonymy of the two best known species requires reconsideration, and that several of the identifications made by Gray, Blyth, Jerdon, and Anderson are erroneous.

The history of the nomenclature of Himalayan and Tibetan marmots appears to be the following. In 1841,* Mr. Hodgson described a species from the “Kachar” of Nepal and the plains of Tibet under the name of *A. Himalayanus*. In 1843, he redescribed this species and suggested altering the name to *Tibetensis*, and at the same time distinguished a smaller form with a longer tail and somewhat different colouring as *A. Hemachalanus*. From references made at various times to his unpublished catalogue it is probable that *A. Hemachalanus* had originally been called *A. Tibetanus* by Mr. Hodgson, and it appears under that name in the British Museum Catalogue of Mr. Hodgson’s collections. In the same year, 1843, Dr. Gray, in the British Museum ‘List of specimens of Mammalia’, united *A. Himalayanus*,†

* For references see below.

† Under *A. Himalayanus* in this catalogue, after the reference to Hodgson’s description, there is added “Griffith, Jour. A. S. B. 1841, 779?” The proper reference is

and "*A. fulvus*, Eversman" to *A. bobac* of Schreber. There is no evidence that these species had ever been compared, and the only specimen stated to exist in the British Museum at the time was said to be from Siberia.

The next addition to the nomenclature was by Jacquemont, who described a marmot from the range north of the Kashmir valley as *A. caudatus*. His description was published, with a figure of the animal, in the appendix by Geoffroy St. Hilaire to Jacquemont's posthumous work, the 'Voyage dans l' Inde,' in 1844.

In the 'Catalogue of the specimens and drawings of the Mammalia and Birds of Nepal and Thibet presented by B. H. Hodgson, Esq. to the British Museum,' the larger or short-tailed marmot is called *A. bobac*, Gmelin, and the smaller *A. Tibetanus*, Hodgson. The same names are preserved in the second edition of the catalogue issued in 1863.

In 1847 the "large Himalayan marmot" was described by Dr. Jame-son as *Arctomys Tataricus*. This description appears to have been overlooked by Indian naturalists.

In 1851, Horsfield in his 'Catalogue of the Mammalia in the Museum of the Hon. East India Company' classed both *A. Himalayanus* and *A. caudatus* as synonyms of *A. bobac*.

Omitting several notices of the various Himalayan marmots by travellers, the next noteworthy attempt at discriminating the species was by Adams in 1858. He called the "red marmot" of Kashmir *A. bobac*, and the "white marmot" *A. Tibetanus*. It is evident, I think, that most writers apply the name *A. bobac* to Adams's "white marmot."

Blyth in his catalogue (1863) united all the Himalayan marmots under *A. bobac*, Schreber, giving as synonyms *Mus arctomys*, Pallas (which is the original name of *A. bobac*), *A. fulvus*, Eversman, *A. Tibetanus*, *Himalayanus* and *Hemachalanus*, Hodgson (the last with a note of interrogation, however), and *A. caudatus*, Jacquemont. In a foot note Blyth points out the distinctions between Hodgson's two supposed species, but adds that he cannot satisfactorily discriminate two species in the Society's skins and skulls. Dr. Stoliczka* in 1865 was also disposed to unite the two forms found in the western Himalayas, but he gave no details.

Jerdon, in his 'Mammals of India,' considered that Hodgson was correct in separating *A. Hemachalanus* from the short-tailed form and, consequently,

probably J. A. S. B., X, 1841, p. 978, where mention is made by Dr. Griffith of a marmot, the size of a beaver, found at between 11,000 and 12,000 feet in Afghanistan, at the Hageeguk, Kaloo, and Erak passes. Of this animal no specimens appear ever to have been described, but, as I shall subsequently shew, there is a skull, probably from Afghanistan, in the Society's old collection.

* J. A. S. B. XXXIV, p. 111, note.

distinguished two species; *A. bobac* (with *A. Tibetanus* and *Himalayanus* of Hodgson and *A. caudatus* of Jacquemont as synonyms) and *A. Hemichalanus*. Fitzinger in his 'Versuch einer natürlichen Anordnung der Nagerthiere' enumerates two Himalayan and Tibetan species of *Arctomys*, which he calls *A. Tataricus*, James. (with, as synonyms, *A. Himalayanus*, Hodgs. *A. bobac*, Gray, and *A. caudatus*, Gieb.) and *A. caudatus*, Isid. Geoffr.

In Dr. Falconer's posthumous 'Palæontological Memoirs' there is an excellent description of the common marmot of Western Tibet with a full account of the animal's habits. He calls the species *A. Tibetana*, and in a note by the editor it is apparently identified with *A. Himalayanus*, an identification which, as I shall shew hereafter, is incorrect.

Dr. Anderson in 1871* distinguished two species of marmot from Ladák and the Kuenlun mountains, one of which he identified as *A. bobac* (with *Mus arctomys*, Pallas, *Arctomys fulvus*, Evers., *A. Himalayanus* and *A. Tibetanus*, Hodgs. *A. caudatus*, Jacquemont, *A. bobac*, Gray, Horsfield, Blyth, and Stoliczka, and *A. Tibetanus*, Adams as synonyms), the other with *A. Hemichalanus* (synonyms—*A. bobac* of Adams and partly of Blyth and Stoliczka).

In 1870, MM. Milne-Edwards described *Arctomys robustus* from Mo^u-pin in Eastern Tibet. And I may conclude these notices by a reference to M. Severtzoff's work 'Turkestanskie Jevotnie,' in which *A. baibacinus*, Brandt and *A. caudatus*, Geof. are said to be found in Western Turkestan. Unfortunately the work in question is entirely in Russian and several of the identifications are incorrect, so that it is impossible to feel any certainty as to the animal which Severtzoff has identified with *A. caudatus*. I think it improbable that the Kashmir marmot is really found in Russian Turkestan. It is more probable that the species is the *A. aureus* described on a previous page† from the specimens obtained by the late Dr. Stoliczka at the Kaskasu pass between Yárkand and the Pámir.

I may here state at once that I have reason to believe that, besides *A. robustus*, there are not two, but three species of Himalayan or Tibetan marmots, and that a great part of the confusion in the nomenclature is due to this circumstance.

In the synonymy above quoted one name frequently occurs, which appears to me to have been admitted by mistake. This is *Arctomys fulvus*, Eversman. Blyth gives no reference; Gray, in the British Museum Cat. p. 148, gives Griffith, A. K. t. 118, and, as Anderson gives precisely the same,

* The title of Dr. Anderson's paper in the Proceedings of the Zoological Society 'On some rodents from Yárkand' is unfortunate, for only two of the four species described had been obtained in Turkestan territory and not one was from the neighbourhood of Yárkand, whilst all four are found in Ladák.

† Ante, p. 109 of this volume.

I suppose there may be such a name in some editions of Griffith's Animal Kingdom, though I cannot find it in the copy in the Society's library. In any case, I have no doubt the species is really *A. fulvus* of Lichtenstein, described in Eversman's 'Reise nach Buchara,' p. 119. That species is a *Spermophilus* and not a true *Arctomys*,* and, consequently, is distinct from all the Himalayan species, none of which, so far as is known, have cheek pouches.

The next point for consideration is what is *Arctomys caudatus* of Jacquemont. As it is described as having a tail two-thirds the length of the body, it is evidently not *A. bobac*,† to which it is referred by Blyth, Jerdon, and Anderson. It is clearly, on the other hand, the same as the species referred by Anderson to *A. Hemachalanus*. Anderson's specimen agrees pretty fairly with Jacquemont's figure and description; there is more black on the back and tail in the former, and the abdomen wants the ferruginous tint, but neither of these characters is constant. The localities whence the two were procured are close together; the marmot skin obtained by Dr. Henderson and described by Dr. Anderson being from Matayon, just north (on the Dras side) of the Zogi-la‡, between Srinagar and Leh; whilst Jacquemont's type was shot at a place which he called Gombour or Gombur, close to the head of the Sind valley, but on the Indus side of the watershed and in the valley of a stream running into the Dras river.

There is a possibility of a second and smaller marmot being found in the Kashmir ranges, for Vigne, Travels in Kashmir &c., II. p. 230, mentions seeing one, as large as a small fox, on the road from Srinagar to Skardo. The animal which I identify with *A. caudatus* is the size of a very large fox.

A skin just received at the Indian Museum from Dr. Aitcheson at Srinagar agrees with that described as *A. Hemachalanus* by Dr. Anderson, except that the back is blacker. Mr. Lydekker informs me that these skins are precisely like those of all the marmots he saw on the ranges north of Kashmir.

Still, however, I am in no way prepared to admit that Dr. Anderson was correct in identifying the Ladak marmot with Mr. Hodgson's *A. Hemachalanus*. The former is a large marmot, one of the largest known species, the skull measuring 105 mm. (4. 12 inches) or as much as *A. robustus*. Hodgson's *A. Hemachalanus* on the contrary must be a small marmot, the body being only 12 to 13 inches long, and the tail $5\frac{1}{4}$ to $5\frac{1}{2}$, the corresponding dimensions (taken from skins) of the Ladak marmot being 22 and

* Brandt, Bull. Ac. Imp. Sc., 1844, II, p. 366.

† This has been noticed by MM. Milne-Edwards, Rech. Mam, I, p. 312.

‡ This name has been converted into Tooglen pass in the P. Z. S. 1871, p. 562.

10½ inches.* Dr. Anderson concludes that Mr. Hodgson had never seen an adult of *A. Hemachalanus* and that he drew up his description from immature specimens. I do not think this view is probable. Hodgson was careless in matters of nomenclature, as many naturalists were in his time, but he collected largely and studied the animals he described carefully, as is shewn by the minuteness of his descriptions. I scarcely think, had the specimens he described been half grown that he would have overlooked the evident immaturity of the skulls, which he must have extracted, for he describes the teeth. Moreover, I think Dr. Anderson must have overlooked Mr. Hodgson's remark that he had kept some of the smaller marmots alive for months, one of them for over a year and a quarter. Surely he would have noted their growth during that period. I cannot say how long a marmot may be in attaining its full growth, but if it requires more than a year, it differs greatly in this respect from most rodents.

There are also, I think, some important differences between the colouration of Hodgson's *A. Hemachalanus* and the Kashmir marmot. The former is described as having the general colour "dark grey with a rufescent tinge which is rusty and almost ochreous red on the sides of the head, ears and limbs, especially in summer. Bridge of nose and last inch of tail dusky brown." In the latter the general colour is more yellow, the whole lower parts and the limbs are ferruginous (there appears to be much variation, perhaps sexual, in the colour of the upper parts), the bridge of the nose is not dark, but the tip is, and at least 3 inches at the end of the tail are black.

It is true that Dr. Anderson mentions his having obtained skins purchased at Darjiling which were undistinguishable from the Ladák marmot.† It is probable that these skins had been brought from upper Sikkim, or Tibet, but if so, and if they are correctly identified, the only conclusion I can come to is that these must be three species of marmots in the Himalayas of Sikkim and Nepal.

A. Tataricus I am unable satisfactorily to identify. The reference in Wiegmann's 'Archiv'‡ runs thus "A supplementary description of the large Indian Marmot has appeared by Dr. Jameson, who has applied to it the name of *Arctomys Tataricus* (Inst. p. 384)." The work referred to is

* The length of the tail in the Ladák specimen is without the hair at the end. In Mr. Hodgson's measurement the hair is, I think, included, although its inclusion is not specified, because it is comprised in the corresponding measurement of the tail of *A. Himalayanus* on the same page.

† Mr. Wood-Mason has had search made for these skins, but owing to so many of the Museum specimens having been packed away pending their transfer to the new building, it has not been possible to find them.

‡ 1848, Pt. 2, p. 155.

probably a French one, L' Institut, at least so I infer from the fact of a paper by Gervais quoted with a similar reference in the 'Archiv' being assigned to this magazine in Carus and Engelmann's 'Bibliographia Zoologica'. At the same time neither Jameson's nor Gervais' paper is quoted in the Royal Society's Catalogue, although L' Institut is included in the works catalogued.

There is a short paper by Dr. Jameson on the Zoology of Chinese Tartary in the Calcutta Journal of Natural History,* in which he briefly mentions a marmot which he observed beyond the Niti pass, and of which he says that it is of a reddish yellow colour and the size of a rabbit. I know of no Himalayan marmot which when adult is so small as a rabbit; the smallest species is *A. Hemachalanus*, and possibly this may have been the animal observed by Jameson, but in Weigmann's 'Archiv' he is said to have described the *large* Indian marmot: of course it does not follow that the species seen by him north of the Niti Pass was the same which he subsequently named *A. Tataricus*. Meantime the identification is of less moment, because in all probability the species named by Jameson was either *A. Himalayanus*, *A. Hemachalanus*, or *A. caudatus*, all of which names have priority over *A. Tataricus*.

But the most important point of all is the identification of the short-tailed Himalayan marmot with *A. bobac*. This apparently was made by Gray without his having examined specimens of *A. Himalayanus*; and Blyth, Jerdon, and Anderson, so far as I know, had never seen examples of the true *A. bobac*, so that I doubt if the species have ever been compared. Pallas (Zoog. Ros. As. I, p. 155) united all the known† Asiatic marmots without cheek pouches to the *Bobac*, which he called *Arctomys Baibàk*, but he described the Kamschatkan race as a well marked variety. Brandt (Bull. Ac. St. Pet. 1844, II, p. 364) separated this Kamschatkan form as a distinct species, which he called *A. Camschatica*, but which he suggested might be identical with the American *A. monax*, and he indicated another species from the Altai under the name of *A. baibacina*, which, however, he did not describe.‡ Severtzoff quotes this species *A. baibacinus* from western Turkestan. Without attaching much importance to this circumstance for the reasons already mentioned, I think it yet remains to be shewn that the true *A. bobac* of Schreber, *Mus arctomys* of Pallas, is found in Central Asia at all. The name was originally applied to the marmot of Poland and

* Vol. VII, p. 360.

† Of course no Himalayan marmots had been described in 1811 when Pallas's work was first published.

‡ He appears to have described it subsequently in a paper on the vertebrata of Siberia, which I cannot find. It is mentioned by Milne-Edwards in Rech. Mam. p. 311, note.

Galiccia, which appears to be a much smaller animal, weighing 8 to 10lbs., the body being 16 inches, the tail 4 inches 4 lines, or including the hair 5' 4" long, whereas in *A. Himalayanus* the head and body measure 22 to 24 inches, and the tail $6\frac{3}{4}$ with the hair according to Jerdon, $5\frac{1}{2}$ to $6\frac{1}{4}$ according to Hodgson. Pallas's original measurements of *A. bobac*, which I quote above,* are probably in French inches, which would render the difference rather less, but still it is very considerable.

Pallas's original description of the colour of *A. bobac* runs thus: *Color rostro et circa oculos magis minusve fusco-nigricans, inter mystaces sub-ferrugineus; parotides pallidæ, gula ferruginea, reliquum corpus infra et artus interiore latere ferrugineo-lutescentia; supra gryseus, pilis longioribus nigris, vel fuscis apice gryseo-pallidis magis minusve inumbratus. Cauda basi subtus ferruginea, majore parte lutescens, a medio picea, apice atra.* The animal referred to *A. Himalayanus* does not differ greatly in colour from Pallas's description. MM. Milne-Edwards,† however, point out that *A. bobac* is a very much paler animal than *A. robustus*, which appears closely to resemble *A. Himalayanus*, and may perhaps be the same.

On the whole I think it is far safer for the present to keep *A. Himalayanus* distinct from *A. bobac*. I have not sufficient materials at present to determine whether the short-tailed marmot of the Kuenlueu and Ladák is absolutely identical with the type of *A. Himalayanus*, but it appears to correspond fairly and I know of no distinction.

The figure of *A. robustus* in the 'Recherches sur les Mammifères' is much more richly coloured than *A. Himalayanus* is, but the authors of the work point out that the plate is over-coloured. The species are evidently very closely allied and may possibly be identical. The skulls are very similar, the nasals being a little shorter in *A. robustus*, and the point of bifurcation of the sagittal crest further back, but there is a possibility that these differences may be due to age, and it is evident from the state of the teeth that the figured skull of *A. robustus*, although apparently full grown, is younger than that of *A. Himalayanus* which I have compared with it: this skull of *A. Himalayanus* is from one of the skins brought by Dr. Henderson from the Sanju Pass, Kuenlueu range. There are, however, some little differences in the form of the zygomatic arch, &c., and especially in the relation of the longitudinal to the transverse diameter, which make me hesitate to consider the two the same.

In trying to throw some light upon this question of the Himalayan marmots, I have examined the following specimens.

I. Four skins with skulls of *A. aureus* from the Kaskasu Pass.

* Glires, p. 113.

† Recherches Mam. p. 311.

II. Three skins of *A. Himalayanus* (the same as examined and described by Anderson) from Kitchik Yilak, close to the Sanju Pass in the Kuenlun range, south of Yarkand ('Lahore to Yarkand,' p. 101).

III. A skin of *A. caudatus* (the same as described by Anderson as *A. Hemachalanus*) from Matayon on the Zogi-la near Drás between Kashmir and Ladák, and a flat skin of the same probably from Kashmir; also a skull of the same brought by Mr. Lydekker from the range north of Kashmir.

IV. The specimens made over by the Asiatic Society to the Indian Museum, three stuffed skins, a skeleton, and two skulls, all enumerated in Blyth's Catalogue*. These require a few words of notice. By both Blyth and Anderson the whole have been referred to *A. bobac* (*i. e.* *A. Himalayanus*). Two stuffed specimens (one of them young and both with imperfect tails) which were presented by Mr. Hodgson, probably belong to this species. The other specimens are a stuffed skin and the skeleton from an animal brought alive to Calcutta from Sikkim, and two skulls, one presented by Lieut. Brownlow, who probably procured it in the western Himalayas, and the other from the Burnes collection, and, therefore, it may be expected, from Afghanistan. I have carefully examined the three skulls and am convinced that they belong, in all probability, to three different species, that of the skeleton differing widely from both the others in the form of the palate and of the nasal bones, in the length of the sagittal crest and the point of its bifurcation, whilst of the two remaining one is much larger than the other, besides other differences. The skeleton is evidently that of a fully adult animal. It measures from snout to insertion of tail 15 inches along the curve of the back, the tail vertebræ $4\frac{1}{2}$. This is very close to the measurement of *A. Hemachalanus*, and the skin agrees with the description of that species in having the frontal portion of the face dark brown. The fur is short and thin, but it is scarcely probable that the fur of a marmot which had lived for months in Calcutta would retain its original character. I think it highly probable that this specimen really belongs to *A. Hemachalanus*. It certainly does not agree with *A. Himalayanus*.†

The skull presented by Lieut. Brownlow is, I find by comparison, that of *A. caudatus*. The Burnes' collection skull, although somewhat resembling that of the new species *A. aureus*, appears to me to belong to a

* Cat. Mam. Mus. As. Soc., p. 108.

† I should add, that in these specimens, as in all other skins either of birds or mammals, which have been exposed to the light for many years in Calcutta, the colours have faded greatly, and in all the mammals the texture of the fur appears to have changed, becoming much harsher. I think it much to be regretted that small mammals should be mounted at all; as a rule valuable skins and types should be kept unmounted in drawers, and not exposed.

different and probably undescribed species, which should be looked for in Afghanistan. It is very possibly the form mentioned by Dr. Griffith as seen by him at the Hageeguk, Kaloo, and Erak passes,* and also briefly referred to in Sir Alexander Burnes' 'Cabool.†

It is useless to refer to the various notes by travellers, on the marmots observed by them, in the hope of ascertaining the distribution of the different species, since the external differences are, as a rule, not sufficient to render the brief descriptions given characteristic of any particular kind, and the task of determining the exact range of each species must be left to future research. I shall conclude this paper by giving the names and the synonymy, so far as I have been able to unravel it, of the four species, the existence of which in the Himalayas and the neighbouring ranges to the north-west I consider probable, merely adding that in all probability another species, hitherto undescribed, inhabits Afghanistan. I am quite at a loss to conceive what is the form with large ears represented in Hooker's 'Himalayan Journals,‡ and which is said to migrate sometimes in swarms from Tibet to Upper Sikkim. Certainly, no known Himalayan marmot approaches this animal in the structure of the ears§.

Section 1.—*Short-tailed marmots having the tail less than one third the length of the head and body.*

1. ARCTOMYS HIMALAYANUS.

A. Himalayanus, Hodgson, J. A. S. B., 1841, X, p. 777.

"*A. Himalayanus* of Catalogue, potius *Tibetensis* hodie," Hodgson, J. A. S. B., 1843,

XII, p. 409.

"*A. bobac*, Schreb." *partim*, Gray, List of the specimens of Mammalia in the collection of the British Museum, 1843, p. 148, *nec* Schreber.

"*A. bobac*, Gmelin", Gray, Cat. spec. &c. Mammalia and Birds of Nepal and Thibet presented by B. H. Hodgson, Esq. to the British Museum, p. 23, (1846); *nec* Gmelin.—*Ib.* 2nd Edition, p. 12, (1863).

? *A. Tataricus*, Jameson, L'Institut. 1847, XV, p. 384.

"*A. bobac*, Schreb." Horsf. Catalogue of Mammalia in the India House Museum, p. 164, (1851); *nec* Schreber.

"*A. Tibetanus*, Hodgson." white marmot of Europeans, Adams, P. Z. S. 1858, p. 521.

"*A. bobac*, Schreb." *partim* Blyth, Cat. Mam. Mus. As. Soc., p. 108, (1863); *nec* Schreber.

"*A. bobac*, Schreb." Jerdon, Mammals of India, p. 18, (1867), *nec* Schreber.

"*A. Tataricus*, Jameson," Fitzinger, Sitzungsber. k. Ak. Wiss. Wien, 1867, LV, 1, p. 491.

* See note on page 114.

† p. 163.

‡ Vol. II, pp. 109, 170, smaller edition.

§ I cannot help feeling some doubt as to whether the animal figured is a marmot at all.

A. robustus, H. and A. Milne-Edwards, *Nouv. Arch. du Musée*, VII, Bull. p. 92 (1870).—*Recherches sur les Mammifères*, I, p. 309, Pl. XLVII, XLIX.

"*A. bobac*, Schreb." Anderson, *P. Z. S.*, 1871, p. 560, *nec* Schreber.

General colouration greyish fulvous, beneath yellow, hair of the back with very short black tips, tail dark brown at the end. Length 22 to 24 inches, tail with hair at the end $5\frac{1}{2}$ to $6\frac{1}{4}$.

Hab.—Tibet : Ladák : Kuenluen south of Yárkand.

Section 2.—*Marmots with tails one third or more than one third the length of the head and body.*

2. ARCTOMYS HEMACHALANUS.

A. Hemachalanus, *Hodgs.*, *J. A. S. B.* 1843, XII, p. 410.

"*A. Tibetanus*, *Hodgs.*," Gray, *Cat. Mam. Birds Nipal*, p. 24, (1846)—2nd Edition p. 12, (1863).

"*A. bobac*, Schreber" *partim*, Blyth, *Cat. Mam. Mus. As. Soc.* p. 108, (1863), *nec* Schreber.

"*A. hemachalanus*, Hodgson," *Jerdon, Mam. Ind.* p. 182, (1867).

"Colour dark grey with a full rufous tinge, which is rusty and almost ochreous red on the sides of the heads, ears and limbs, especially in summer. Bridge of nose and last inch of tail dusky brown. Length 12 to 13 inches tail (with hair) $5\frac{1}{4}$ to $5\frac{1}{2}$."*

Hab.—Sikkim and Nepal, in the higher regions of the Himalayas.

3. ARCTOMYS CAUDATUS.

A. caudatus, Jacquemont, *Voyage dans l'Inde*, Vol. IV, *Zoologie*, p. 66, *Atlas*, Vol. II, Pl. 5, (1844).

"*A. bobac*, Schreber," red marmot of Europeans, *Adams, P. Z. S.*, 1858, p. 521, *nec* Schreber.

"*A. bobac*, Schreber," *partim* Blyth, *Cat. Mam. Mus. As. Soc.* p. 108, (1863), *nec* Schreber.

"*A. bobac*, Schreber," *partim*, *Jerdon, Mam. Ind.* p. 182, (1867), *nec* Schreber.

"*A. caudatus*, *Isid. Geoff.*," *Fitzinger, Sitzungb. k. Ak. Wiss. Wien*, 1867, LV, 1, p. 491.

A. tibetana, *Falconer, Palæontological Memoirs*, I, p. 583, *nec A. Tibetanus*, *Hodgs.*

"*A. hemachalanus*, Hodgson," *Anderson, P. Z. S.* 1871, p. 561, *nec* Hodgson.

Colour rich rufous yellow when adult, more or less black on the back : sometimes the back is black throughout : lower parts with a strong ferruginous tinge ; tail black for the greater portion of its length. Head and body about 25 in., tail with hair 13, or more than half the length of the body.

Hab.—Mountains north of Kashmir : Ladák.

* These are Hodgson's measurements, but I anticipate that the animal grows to a larger size, to judge by the skull, which is as large as that of *A. aureus*.

4. *ARCTOMYS AUREUS.*

A. aureus, W. Blanf., ante, p. 106.

On a previous page I described this species very briefly. The following is a fuller account, taken from four specimens, three brought by Dr. Stoliczka and one by Captain Biddulph from the mountains west of Yárkand.

General colour tawny to rich brownish yellow, the dorsal portion conspicuously tinged with black from all the hairs having black tips, but these are far more conspicuous in some specimens than in others; face grey to blackish with a rufous tinge, covered with black and whitish hairs mixed, which are about half an inch long on the forehead, the black hairs more prevalent in some specimens, apparently males, than in others; the middle of the forehead sometimes more fulvous. Just on the nose is a blackish brown patch, and there is a narrow band of short black hairs mixed with white around the lips: sides of the nose paler; whiskers black. Hairs of the back $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, dark slaty at the extreme base for about $\frac{1}{4}$ inch, then yellow, becoming deeper golden yellow towards the extremity, the ends black. In the blackest specimens (? males) the posterior portion of the back wants the black tips. Tail the same colour as the back, except the tip, which is black; the length of the black tip varies, but never exceeds about $2\frac{1}{2}$ inches in the specimens before me, and in three out of the four it is only about an inch: hairs of the tail about 2 inches long, brown at the base. Lower parts rather browner, the hairs shorter and thinner, chocolate brown at the base, without the short woolly under-fur, which is very thick on the back. Feet above yellowish tawny like the sides.

Length taken on the dried skins :

Nose to insertion of tail,	16·5 to 18·75
Tail, without hairs at the end,	5 to 6·5
Hairs at end of tail,	1·5 to 1·75
Fore-foot (palma) to end of toe, without claws,	2·05
Mid toe, without claw, measured below,	0·8
Claw, measured above,	0·6
Hind foot (planta) to end of toe, without claws,	2·9
Mid toe, without claw,	0·8
Claw of do., measured above,	0·52

This is a very much smaller animal than *A. caudatus*, and its tail appears shorter in proportion and with less black. The colour of the lower parts is less rufous and the feet are tawny yellow, not ferruginous as in the larger form. The fur of *A. aureus* too is softer. From *A. Himalayanus* the present species is distinguished by its much longer fur, by being much yellower in tint and less grey, and by its longer tail. It is also much smaller. From *A. Hemachalanus* it may be recognised by its longer tail and richer colouration.

The following are the dimensions of skulls of all the above species in parts of a metre, those of *A. robustus* having been taken from the figures. I also add the measurements of the skull of a specimen of *A. bobac* belonging to the Berlin Museum.

	<i>A. Himalayanus.</i> (Kuenlun).	<i>A. Himalayanus.</i> (North of Sikkim).	<i>A. robustus.</i>	<i>A. Hemachalans.</i>	<i>A. caudatus.</i>	<i>A. aureus.</i>	<i>A. bobac.</i>
Length from occipital plane to anterior end of nasal bones,	·105	·101	·104	·093	·105	·094	·0885
Breadth across widest part of zygomatic arches,	·0655	·0675	·065	·061	·066	·057	·059
Do. behind postorbital processes,	·019	·019	·019	·020	·016	·017	·0165
Length of nasal bones,	·045	·040	—	·038	·042	·038	·038
Breadth do. behind,	·010	·013	·011	·011	·017	·0105	·0105
Do. do. in front,	·018	·018	·015	·016	·020	·0165	·0155
Length of row of upper molars,	·025	—	·025	·024	·0235	·020	·0215
Do. lower jaw from angle to alveolar margin,	·069	·070	·069	·064	·074	·066	·0625
Height of do. at coronoid process,	·0425	·039	·037	·036	·041	·035	·036

P. S.—*Oct. 28th.* Some months have elapsed since the above paper was written, and in the meantime, through the kindness of several friends, I have been enabled to add materially to the evidence as to the distinctions of the different species of marmots.

In the first place, I am indebted to Professor Peters of Berlin, who, with great kindness and liberality, has sent a skin and skull of *Arctomys bobac* belonging to the Berlin Museum for examination. In its external characters this animal differs widely from *A. Himalayanus*. It is a sandy-grey animal with a brown wash, without a single black hair on its body, the hairs on the back being dusky at the base, then dirty white, and the tips of the longer hairs on the back and sides being brown. The lower parts throughout shew a ferruginous tinge. The terminal portion of the tail is brown. This skin measures from nose to rump 21 inches, tail 5½; but it is very much smaller than *A. Himalayanus*.

Of course this specimen may have faded and the tips of the hairs may have been black originally, as in Pallas's description, but there is nothing in the character of the skin to render this supposition probable, and if the tips of the hair had become paler, I should hardly have anticipated that they would have done so to precisely the same extent throughout the body. Moreover, the skin before me coincides closely with the figure in Schreber's *Säugethiere*, Pl. CCVIII, and with Messrs. Milne-Edwards' description.

Professor Peters tells me that the skin sent is from Siberia, and that he has endeavoured for years in vain to procure a Polish or Galician specimen.

Compared with the skins of *A. Himalayanus*, this specimen of *A. bobac*, besides being paler and having brown instead of black tips to the long dorsal hairs, has these hairs much longer and their dark tips more developed, and the fur generally is finer and softer. The skull, with a general similarity of outline, exhibits numerous differences, the most marked being the very much smaller proportional size of the molars in the upper jaw. The crown of the third molar is *A. Himalayanus* measures 6 mm. across, in *A. bobac* only 4.5 mm.

I am also indebted to Dr. Günther for having very obligingly re-examined the types of *Arctomys Hemachalanus* v. *Tibetanus* in the British Museum in order to ascertain if they were adults. He writes to me as follows :

“The skull of the type of *A. Tibetanus* is that of an adult animal, but “this type is the most wretched specimen I have ever handled. It was an “individual brought up in captivity ; size that of a very small rabbit, skin “nearly hairless, claws abnormally long and as sharp as a needle, teeth “carious, incisors malformed. The frontal bones are gone, but I suppose “that they could not have been much arched, and the palate is very shallow, “very slightly concave.”

“There is another flat and imperfect skin of this *A. Tibetanus* from “Hodgson’s collection. It is somewhat larger than the former specimen, “and is evidently adult, but there is no skull. Taking all the evidence “before me, I believe that this species but slightly exceeded a rabbit in “size. But then what differences in size you observe in our Swiss mar- “mots.”

The important point is, of course, to ascertain that Mr. Hodgson’s original types were adult. The length of the tail shews that the species is distinct from *A. caudatus*, and the skulls differ very considerably. But some further evidence is forthcoming. Some time after the preceding paper was written the dead body of a marmot was sent to the Indian Museum by Mr. Rutledge. The animal is said to have been originally brought from Bhútán, but it has lived for a long time in captivity, and as usual the skin is in wretched condition and almost hairless. The dimensions, however, agree with those of *A. Hemachalanus*, and when the skull had been cleaned, it proved precisely similar to that of the old skeleton in the Museum, belonging to the animal said to have brought from Sikkim and to have lived for months in the Asiatic Society’s compound. Mr. Fraser has also found, amongst the accumulated collections of the Museum, another skin and skull of a young individual, which also had been kept tame.

There is thus evidence of 5 individuals of this species at least, and I

have examined 3 skins and skulls myself. With the evidence before me, I have not the slightest doubt that a small marmot does inhabit the northern parts of Sikkim and Nepal, and that it is quite distinct in structure, colour, and size from the large *A. caudatus* of Kashmir and Ladak. Unfortunately, the Sikkim skins which Dr. Anderson identified with a specimen belonging to the Kashmir species have not been found. It is remarkable that every individual of *A. Hemachalanus* yet examined has been kept in captivity; skins of the wild animal are a great desideratum. The skull of the specimen received from Mr. Rutledge is perfectly well formed and all the teeth are healthy.

Dr. Aitcheson of Srinagar has had the kindness to make enquiries about the marmots of Kashmir, and he has sent me specimens of young *A. caudatus*. As in most young animals, the colours are indistinct, and there is a peculiar immature appearance about the fur. These young specimens can be at once distinguished from *A. Hemachalanus* by their longer tails.

It will be seen that the whole of the additional evidence tends to prove that, exclusive of *A. robustus*, there are three and not two species of marmot in the Himalayas and Tibet, and that neither of these species is identical with *A. bobac*.

Within the last few days, Mr. Mandelli of Darjiling has sent to the Indian Museum a magnificent collection of mammal skins from Sikkim and Tibet, part of which he has presented to the Museum, and he has most liberally allowed me to examine the whole. There is no specimen of *Arctomys Hemachalanus*, but there are two fine skins of *A. Himalayanus*. These coincide very fairly in external characters with those from the Kuenluen, they are a very little greyer in tint and darker on the face, but there can be no hesitation in referring both forms to the same species. The skull of one of Mr. Mandelli's skins has been extracted for me by Mr. Fraser. Although it is near to that of the Kuenluen marmot and to that of *A. robustus*, it differs somewhat from both; its longitudinal and transverse diameters being 101 and 67 millimeters, so that it is decidedly broader in proportion to its length, whilst its height is rather less, and the nasal bones are shorter and less convex. Despite these and other differences, there is a general agreement in details, and I feel disposed to believe that the distinctions are insufficient for separation. Moreover, it is evident that the cranial distinctions already pointed out in the case of *A. robustus* are not greater than those which are found between the two forms of *A. Himalayanus*, and, consequently, that either *A. robustus* must be united to that species, or the Kuenluen marmot must be classed as distinct. I prefer the former view and have adopted it in the preceding synonymy.

Dr. Severtzoff has recently visited London, and I am indebted to Mr. Dresser for obtaining from the Russian naturalist a few notes on some of the

mammals described by him from Western Turkestan. I learn that the species identified as *Arctomys baibacinus* differs from *A. bobac* in being darker above, and more rufous below. It is a mountain species, whilst *A. bobac* inhabits the steppes. Dr. Severtzoff suggests that it may be identical with *A. robustus* (that is, doubtless, with *A. Himalayanus*). As *A. Himalayanus* extends from Eastern Tibet to the Kuenlun, keeping to great altitudes, above the range of almost every other mammal, it is by no means improbable that it may also occur farther to the north.

P. S.—*Nov. 8th.*—In the October number of the ‘Annals and Magazine of Natural History’ just received, Dr. Anderson has described another marmot from the mountains north of Kábul under the name of *A. dichrous*. From the description this appears to be distinct from *A. aureus* and the other species referred to above, and it is very probably the form indicated by Burnes and Griffith, a skull of which, as already mentioned, exists in the Society’s old collection.
